The Final Frontier™

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SYSTEM REQUIREMENTS

Apple® II, II+ or Franklin Ace1000 • 48K RAM
Applesoft • DOS 3.3 • One Disk Drive
Joystick (Optional)

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SOFTWARE

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The Final Frontier
APPLE II
FRANKLIN
60009
The Final Frontier

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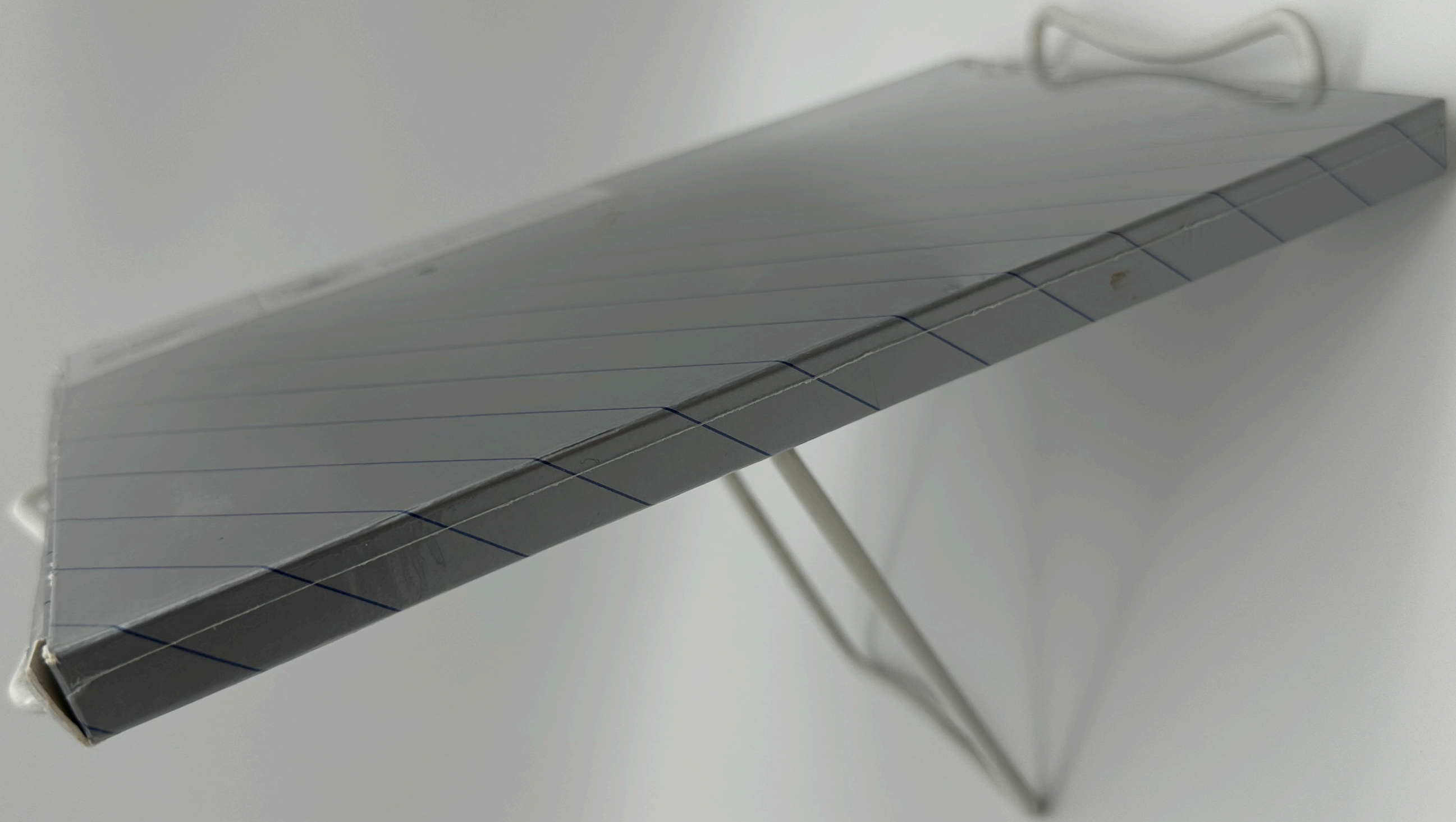

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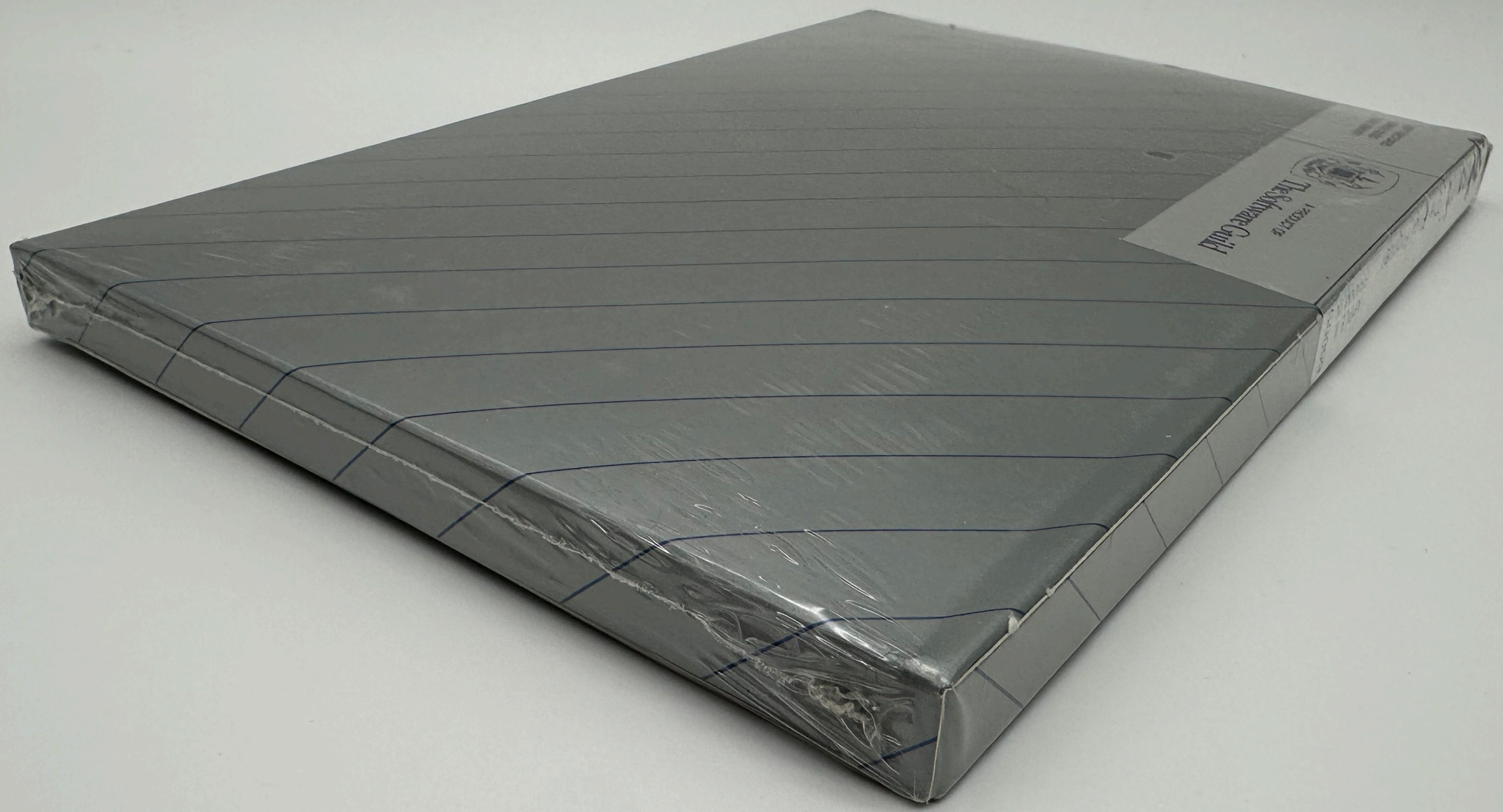
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PACKAGE CONTENTS

Final Frontier Diskette
Instruction Booklet
Warranty Card
Ready Reference Card

OVERVIEW

Your vehicle is an advanced version of the original NASA shuttle, upgraded and modified for a revitalized space program. The space station orbits above, waiting for you to dock with it. As you roll out to the launch pad, you review the stages of flight — liftoff, rendezvous, approach, and finally docking. The radar guidance systems will provide some help, but only your piloting skill can ultimately direct the shuttle craft to port. The countdown reaches zero, and the mighty boosters ignite . . .

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Overview

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Final Frontier™ Control Keys

Using a Joystick

Joystick UP: move down or rotate down
Joystick DOWN: move up or rotate up
Joystick LEFT: move left or rotate left
Joystick RIGHT: move right or rotate right
Switch #1: move back or roll left
Switch #2: move forward or roll right
Switch #3 or </>: toggle Joystick between movement control and rotation control

Keys Used in Both Joystick and Keyboard Modes

<G> - toggle viewfinder (docking only)
<H> - toggle approach radar (docking only)
<RETURN> - kill residual motion (docking corridor only)
<SPACE BAR> - kill all rotational motion (docking only)
<ESC> - interrupt and go to Options Menu
< - > - tip rocket down (liftoff)
< - > - tip rocket up (liftoff)
<RETURN> - ignite/shut down engine (liftoff)

Keyboard Translational Movement (Approach and Docking Phases)

<M> - move down
< I > - move up
< J > - move left
<K> - move right
< L > - move back
< ; > - move forward

Keyboard Rotation (Docking Phase only)

<C> - rotate down
<E> - rotate up
<D> - rotate left
<F> - rotate right
<A> - roll left
<S> - roll right

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...ately direct the shuttle
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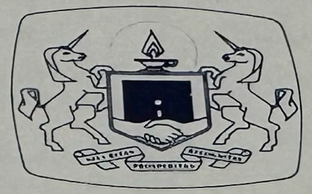

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INPUTS AND OUTPUTS

Inputs are entries which you type into the computer. In this manual inputs are presented in one of two ways:

individual console keys — <RETURN>, <3>, <P>
everything else — *RUN 09/12/82, Roger*

While running the program, the computer will be presenting a variety of information, prompts and messages to you on the screen. In this manual such outputs will be presented in boldface italics:

(sample output) — ***Enter your name***

Note: The <CTRL> key operates like the shift key on a regular typewriter. If you are told to enter <CTRL-P>, just press <P> while holding the <CTRL> key down.

IMPORTANT TIPS

Handle your diskettes with care and keep them in their special jackets while not in use.

Do make sure the shift lock light is lit if running this program on the Franklin Ace. This program recognizes only capital letters.

Do not press <CTRL-C> while the program is running. Results are unpredictable and damage to your program may result.

Do not open the disk drive door while the "in-use" light is on. This may damage your diskette and render it unusable.

Do not try to make a copy of this disk. If during normal use something goes wrong with your diskette, please refer to the Troubleshooting section of this booklet.

WARRANTY CARD

Please take a moment to complete and mail the enclosed Warranty Card. By having your name on file we will be able to provide better customer service, including information on program updates and replacement of damaged diskettes.

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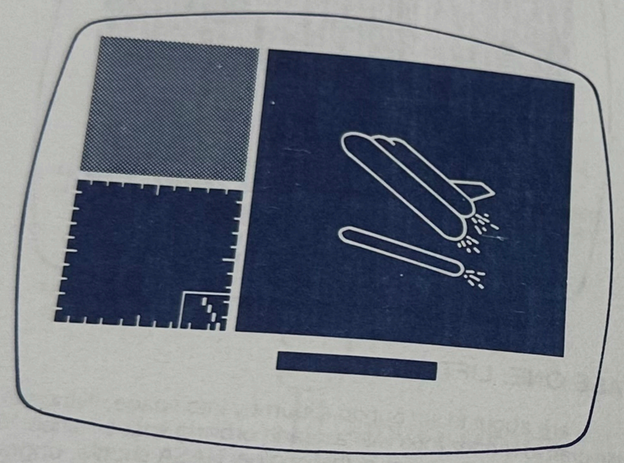
Table of Contents

	Page
System Requirements	Front cover
Package Contents	Front cover
Overview	Front cover
Inputs and Outputs	Inside cover
Important Tips	Inside cover
Warranty Card	Inside cover
I. Preliminaries	1
Getting Started	1
II. A Summary of the Game	3
Selecting Your Mission Profile	3
Starting	3
Scoring	4
Files	4
Phase One: Earth Liftoff	5
Phase Two: Orbital Rendezvous	5
Phases Three and Four: Approach; Alignment and Docking	9
Joystick and Keyboard Modes	9
Using the Keyboard	9
Using a Joystick	10
III. A Description	11
Phase One: Earth Liftoff	11
Phase Two: Orbital Rendezvous	13
Phase Three: Approach	15
Phase Four: Alignment and Docking	17
IV. Troubleshooting	21
Appendices	23
A. Maneuvering	23
Using the Keyboard	23
Using the Joystick	24
B. A Glossary of Terms	25

You can accomplish this easily, given the capabilities of your spacecraft and a minimum of piloting skill. Remember, your ultimate success in docking with the space station hinges upon reaching an initial advantageous orbit with as much fuel remaining as possible.

The original NASA shuttle (the model for your craft) holds solid-fueled boosters and a large expendable external tank to fuel the sustainer engines on the shuttle body. Orbital maneuvers use smaller engines in tail pods next to the sustainers. Your Final Frontier shuttle craft is also boosted by two stages, but the burn times are shorter and the sustainer engines are a part of the external tank. The booster burns for 90 seconds and gets you through the dense parts of the atmosphere with sufficient altitude and velocity for the sustainer to carry you on to orbit. The sustainer burns for 200 seconds and should easily carry you to orbital altitudes and speeds.



The booster and sustainer burn and stage automatically. The only control you have during this phase of the flight is over the altitude of the space craft using the right and left arrow keys (<→> and <←>). If you have failed to reach sufficient altitude or velocity after the sustainer stages, you can ignite the shuttle engine with the <RETURN> key. Turn the shuttle engine off by pressing <RETURN> a second time. Economize your shuttle's energy, however, as you will need it for orbital maneuvers, and Approach and Docking.

The booster and sustainer can pitch the craft only during engine burn. The shuttle has an altitude control system separate from the main engine which can be ignited at any time.

A perfect initial orbit is rarely achieved — even the NASA space shuttle uses a trim burn with the orbital engines to move into a circular orbit. You will most always suffer some residual vertical velocity which will carry you into an elliptical partial orbit. This is quite acceptable, since you can trim your orbit in the next phase, and take advantage of the altitude to reach the space station orbiting at 1.50 earth radii (3185 km. above the earth). To achieve perfect orbit, your vertical velocity should be near zero at engine cut-off.

Remember in this phase your trajectory is ballistic. This means that the vertical velocity is determined by three factors: the force of gravity, the vertical thrust applied to counteract gravity, and the horizontal velocity. The horizontal velocity, which changes only with applied horizontal acceleration, is critical because it provides centrifugal force to overcome gravity. No vertical thrust is required in orbit since the horizontal velocity is sufficient to balance gravity.

PHASE TWO: ORBITAL RENDEZVOUS

Once you have achieved orbital velocity and altitude, Final Frontier will generate a plot of the orbits of the space station and your shuttle craft. Each will proceed on the orbit plot until you press any key to enter the command mode. Your objective is to rendezvous with the space station. From the command mode you can call for the orbital changes required to accomplish this objective, or you can call for the Options Menu.

Once you have elected to change the orbit, Final Frontier will freeze your present orbital position and display another image of the spacecraft one orbital position in advance of your present position. This facilitates your planning for orbital maneuvers in advance. Always stop orbital cruise and set up your maneuvers at least one orbital position in advance of where you wish the maneuver to take place.

You can project an orbit forward (and subsequently backward again) by using the <→> and <←> keys to pick the spot where you want the maneuver to take place. The station orbit is projected forward simultaneously so that you can judge the effect of the maneuver on the relative positions of the spacecraft and space station. Press <RETURN> when you have projected the orbit to the maneuver position you want. Press <ESC> to cancel these functions and return to orbital cruise.